

Revolutionary X-ray Microbeam Delivery System

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We are developing a revolutionary x-ray microbeam delivery system that provides about 100X higher x-ray flux density than the highest performance commercial x-ray microbeam system currently available. The new system is based on a super bright laboratory source that is designed to be substantially brighter than the brightest rotating anode x-ray source currently available, coupled with high efficacy, large solid angle, axially symmetric optics. It will also offer a substantially wider selection of characteristic x-ray energies than are available using the current x-ray source technologies. The outstanding performance of the x-ray source is achieved with patent pending x-ray source technology that incorporates the outstanding thermal and material properties of diamond as a part of the microstructured anode, creates large thermal gradients within the microstructure, and incorporates an optimized electron energy deposition profile. The source is also designed to accumulate x-rays generated from a linear array of x-ray sub-sources. In addition, it uses axially symmetric x-ray reflection optic with a large solid angle of collection from the source and customer selectable beam collimation profile. The high flux x-ray beam delivery system represents an important innovation in x-ray beam delivery technology. Its performance will enable substantial performance improvement in a wide range of x-ray analysis techniques, such as micro x-ray fluorescence (uXRF), x-ray diffraction (XRD), small angle x-ray scattering (SAXS), and total x-ray reflection fluorescence (TXRF). The design and expected performance will be presented.